APPENDIX B: SIGNAL FIELD STRENGTH COMPUTATIONS

Field strength is measured in dBμV/m as seen by the receiving antenna. This is calculated from the peak-power value and the antenna-correction factor using the following equations:

$$G_{dBi} = -29.79 + 20\log_{10}(f_{MHz}) - ACF, \quad \text{(B1)}$$

where G_{dBi} is the gain of the antenna in dBi, f_{mHz} is the frequency in MHz, and *ACF* is the antenna correction factor in dB;

$$A = \frac{\lambda^2 * 10^{\frac{G_{dBi}}{10}}}{4\pi}, \quad \text{(B2)}$$

where *A* is the aperture of the antenna in units of m^2 and λ is the wavelength of the carrier frequency in meters;

$$\lambda = \frac{c}{f_{Hz}}, \quad \text{(B3)}$$

where *c* is the speed of light in m/s (3e8 m/s), and f_{Hz} is the carrier frequency in Hz;

$$P_d = \frac{P_{m(watts)}}{A}, \quad \text{(B4)}$$

where P_d is the power density in watts/m^2, and $P_{m(watts)}$ is the power in watts measured at the output of the antenna; and

$$E_{dB\left(\frac{\mu v}{m}\right)} = 20 * \log_{10}\left(1e6 * \sqrt{P_d * 377}\right), \quad \text{(B5)}$$

where $E_{dB\left(\frac{\mu v}{m}\right)}$ is the E field in dBμV/m measured at the antenna, and 377 is the impedance of free space measured in ohms.